SulTRAC

June 24, 2019

Ms. Jennifer Davison
Remedial Project Manager
U.S. Environmental Protection Agency (EPA) Region 5
77 W. Jackson Blvd.
Chicago, Illinois 60604

Subject: **Summary of Vapor Intrusion Investigations**
Milford Contaminated Groundwater Site
Milford, Clermont County, Ohio
Remedial Action Contract (RAC) 2
Contract No. EP-S5-06-02
Work Assignment No. 201-RICO-B5SW

Dear Ms. Davison:

SulTRAC is submitting the Summary of Vapor Intrusion Investigations at the Milford Contaminated Groundwater site in Milford, Ohio. This summary summarizes five sampling events: the Ohio Environmental Protection Agency (OEPA) 2006 and 2007 sampling events, the SulTRAC 2013 monitoring well sampling event, the SulTRAC 2016 Vertical Aquifer Sampling (VAS) event, and the SulTRAC 2016 soil gas sampling event. In addition, this summary assesses vapor intrusion risk based on the findings of these events.

If you have any questions regarding this report, please call me at (312) 201-7711.
Sincerely,

Karina Kuc
SulTRAC Project Manager

Enclosure

cc: Daniel Olsson, EPA Contracting Officer
Pankaj Parikh, EPA Project Officer
Robie Anson, EPA Remedial Project Manager
Mindy Gould, SulTRAC Program Manager

SUMMARY OF VAPOR INTRUSION INVESTIGATIONS

Under Remedial Action Contract (RAC) No. EP-S5-06-02, Work Assignment No. 201-RICO-B5SW, the U.S. Environmental Protection Agency (EPA) Region 5 tasked SulTRAC to conduct additional Phase II remedial investigation (RI) activities at the Milford Contaminated Groundwater site in Milford, Clermont County, Ohio. In March 2019, as part of the Phase IIB RI, SulTRAC collected soil gas samples on and downgradient of the Baker Feed property.

In addition to presenting the results of the March 2019 soil gas sampling event, this technical memorandum summarizes prior vapor intrusion investigations including (1) results from the Ohio EPA 2006 sub-slab soil gas sampling event near the Baker Feed property, (2) results from the Ohio EPA 2007 soil gas investigation downgradient of the Baker Feed property, (3) results from the SulTRAC 2013 monitoring well sampling event, and (4) results from the SulTRAC 2016 vertical aquifer sampling (VAS) investigation. Each sampling event is summarized below followed by results from the March 2019 soil gas investigation conducted to assess vapor intrusion risks.

Ohio EPA 2006 Sampling Event

In 2006, Ohio EPA collected sub-slab soil gas samples at four locations (SG-1, SG-3, SG-4, and SG-5) near the Baker Feed suspected source area (see Figure 1). As shown in Figure 1, tetrachloroethene (PCE) was detected in one sample (SG-4) at a concentration of 350 parts per billion by volume (ppbv). This concentration is equivalent to 2,374 micrograms per cubic meter ($\mu g/m^3$). This PCE value was used in EPA's vapor intrusion screening level (VISL) calculator (Version 3.5, May 2019) to estimate the cancer risk and non-cancer hazard posed to residential and commercial indoor air. Inputting a PCE concentration of 2,374 $\mu g/m^3$ in the VISL calculator results in the following risk levels:

- Residential cancer risk = 6.6E-06
- Residential non-cancer hazard quotient = 1.7E+00
- Commercial cancer risk = 1.5E-06
- Commercial non-cancer hazard quotient = 4.1E-01

Ohio EPA 2007 Sampling Event

In 2007, Ohio EPA collected soil gas samples at 13 locations (SG-1 through SG-13) downgradient of the Baker Feed suspected source area (see Figure 2). As shown in Figure 2, PCE was detected in four

samples (SG-1, SG-2, SG-3, and SG-12) with a maximum concentration of 7 ppbv. This concentration is equivalent to 47.5 µg/m^3. This PCE value was used in EPA's VISL calculator (Version 3.5, May 2019) to estimate the cancer risk and non-cancer hazard posed to residential and commercial indoor air. Inputting a PCE concentration of 2,374 µg/m^3 in the VISL calculator results in the following risk levels:

- Residential cancer risk = 1.3E-07
- Residential non-cancer hazard quotient = 3.4E-02
- Commercial cancer risk = 3.0E-08
- Commercial non-cancer hazard quotient = 8.1E-03

SulTRAC 2013 Monitoring Well Sampling Event

In 2013, SulTRAC collected groundwater samples at seven temporary well locations (TW-06, TW-07, TW-09, TW-11, TW-12, TW-13, and TW-15) and 14 monitoring wells (MW-02, MW-03, MW-05S, MW-05D, MW-10S, MW-10D, MW-11 through MW-14, and MW-17 through MW-20). The temporary wells and monitoring wells were near and downgradient of the Baker Feed suspected source area and also near the COMCO facility (see Figure 3). To assess potential VI from groundwater to indoor air, PCE and trichloroethene (TCE) results were used in EPA's VISL calculator (Version 3.5, May 2019) to estimate the cancer risk and non-cancer hazard posed to residential and commercial indoor air. Results of this evaluation are presented in Table 1. Sampling locations where groundwater concentrations may potentially result in indoor air cancer risks greater than 1E-06 and non-cancer hazard quotients greater than 1.0 are shown in red on Figure 3.

SulTRAC 2016 VAS Sampling Event

In 2016, SulTRAC collected groundwater samples at 13 VAS locations (VAS-202 through VAS-210 and VAS-213 through VAS-215), three temporary well locations (TW-01, TW-02, and TW-03), and one monitoring well (MW-15). The VAS locations were downgradient of the Baker Feed suspected source area and the monitoring well was near the suspected source area (see Figure 3). To assess potential VI from groundwater to indoor air, the PCE and TCE results for the shallowest sampling interval at each VAS location were used in EPA's VISL calculator (Version 3.5, May 2019) to estimate the cancer risk and non-cancer hazard posed to residential and commercial indoor air (see Table 1). No groundwater sampling locations were identified where concentrations in the shallowest VAS interval may potentially result in indoor air cancer risks greater than 1E-06 and non-cancer hazard quotients greater than 1.0.

SulTRAC 2019 Soil Gas Sampling Event

Based on the four investigations described above and given the magnitude of potential risk/hazards calculated, SulTRAC conducted a vapor intrusion investigation in the area near Baker Feed. A Phase IIB sampling and analysis plan (SAP) addendum was prepared and approved by EPA. The SAP addendum described the vapor intrusion investigation to be conducted. The investigation called for a phased approach. The first phase consisted of collecting soil gas samples at two intervals (8-10 feet bgs and 5 feet above the groundwater table) at up to 15 locations. The second phase included a contingency for collecting sub-slab and indoor air samples based on results of the soil gas investigation.

In March 2019, SulTRAC collected soil gas samples from six locations in the Baker Feed area and from three locations downgradient of the Baker Feed area. For the three downgradient locations, samples were collected from the shallow and deeper interval as planned. For the Baker Feed locations, soil gas could not be collected from any of the deeper intervals and several of the shallow intervals due to lack of soil gas as a result of swelling clay in the area. Additionally, in order to collect the sample, the shallow interval depth had to be adjusted from 8-10 feet bgs to 5 feet bgs. Helium, used as a tracer gas, was detected in samples SG-05-05-032719, RI-IIB-SG-06-05-032719, RI-IIB-SG-07-05-032719. These samples are located on the eastern portion of the Baker Feed property. The remaining three samples collected on the western portion of the Baker Feed property did not have any helium detections. Figure 4 shows the locations of soil gas samples collected during the March 2019 sampling event.

Soil gas results were reviewed to assess whether site-related chemicals (chemicals already detected in groundwater) were potentially migrating to indoor air through the vapor intrusion pathway. PCE was detected in four soil gas samples and TCE was detected in two soil gas samples. However, none of the detections exceeded the residential soil gas VISL of 1,390 $\mu g/m^3$ for PCE or 69.5 $\mu g/m^3$ for TCE. Soil gas sample results are presented in Table 2. PCE and TCE detections are shown on Figure 4.

Conclusions

Ohio EPA sub-slab and soil gas sampling results indicate that vapor intrusion may potentially be an issue at one location (SG-4). SG-4 is located within the Baker Feed suspected source area. SulTRAC groundwater sampling results indicate that vapor intrusion may potentially be an issue at eight locations (MW-11, MW-12, MW-14, MW-17, MW-18, MW-20, TW-03, and TW-09). All of these locations except MW-12 are also in the Baker Feed suspected source area. MW-12 is located downgradient of Baker Feed near VAS transect B.

Based on the evaluation of Ohio EPA soil gas sampling and Phase I and II RI groundwater results, SulTRAC collected soil gas samples from Baker Feed and downgradient of Baker Feed to assess the vapor intrusion pathway. Sample results did not exceed VISLs and therefore, do not indicate that vapor intrusion is a problem either on or downgradient of the Baker Feed property. Based on the soil gas results, PCE and TCE concentrations in groundwater, the depth to groundwater at the site, and the tight clays present in the vadose zone, additional vapor intrusion sampling (sub-slab and indoor air) does not appear to be necessary.

FIGURES

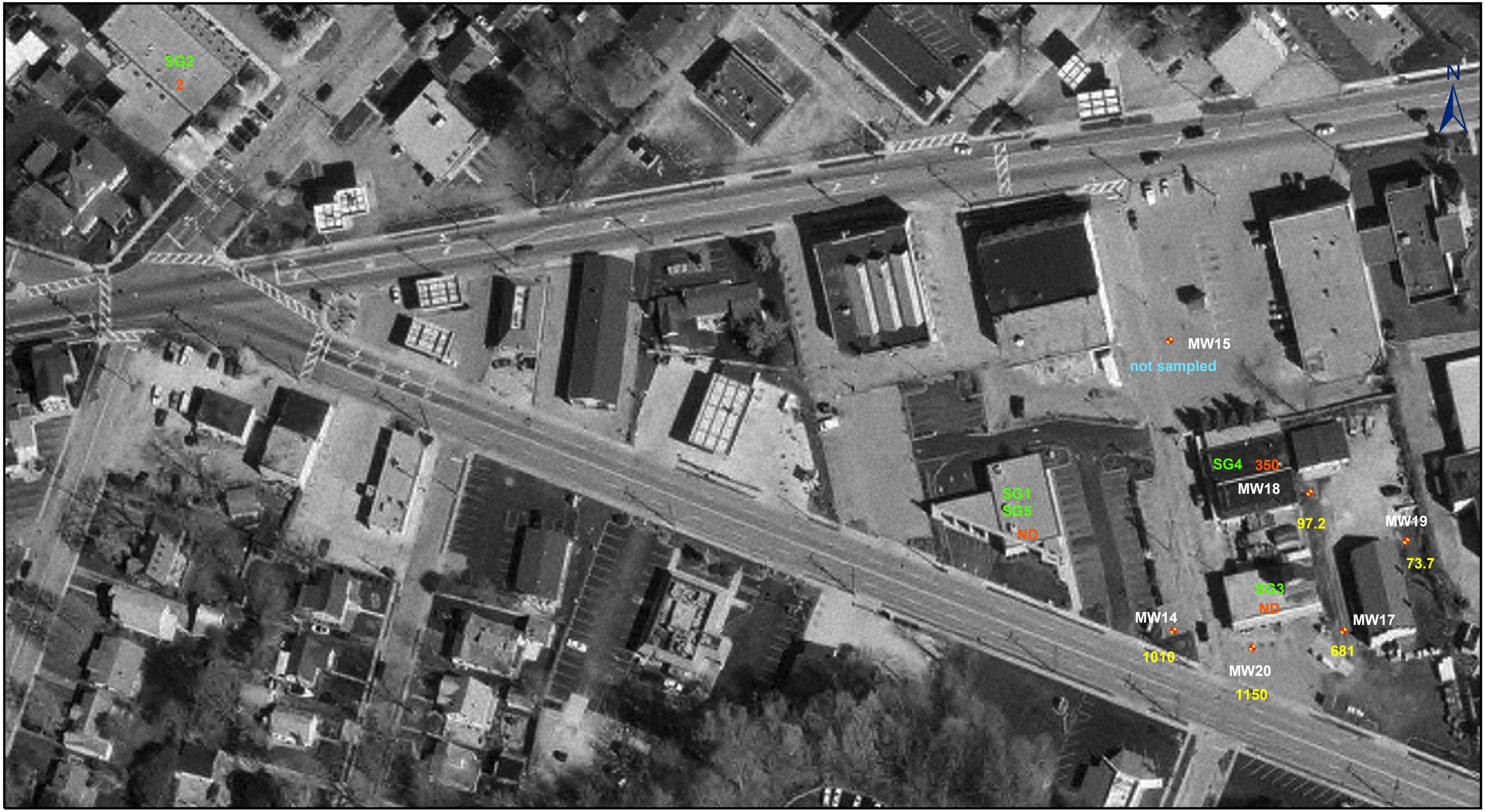
(Four Pages)

1 – OEPA September 2006 Sub-Slab Soil Gas and Ground Water Investigation Results

2 – OEPA March 2007 Soil Gas PCE Concentrations

3 – SulTRAC Groundwater to Indoor Air Vapor Intrusion Screening Results

4 – SulTRAC March 2019 Soil Gas Sample Locations and Results



OhioEPA

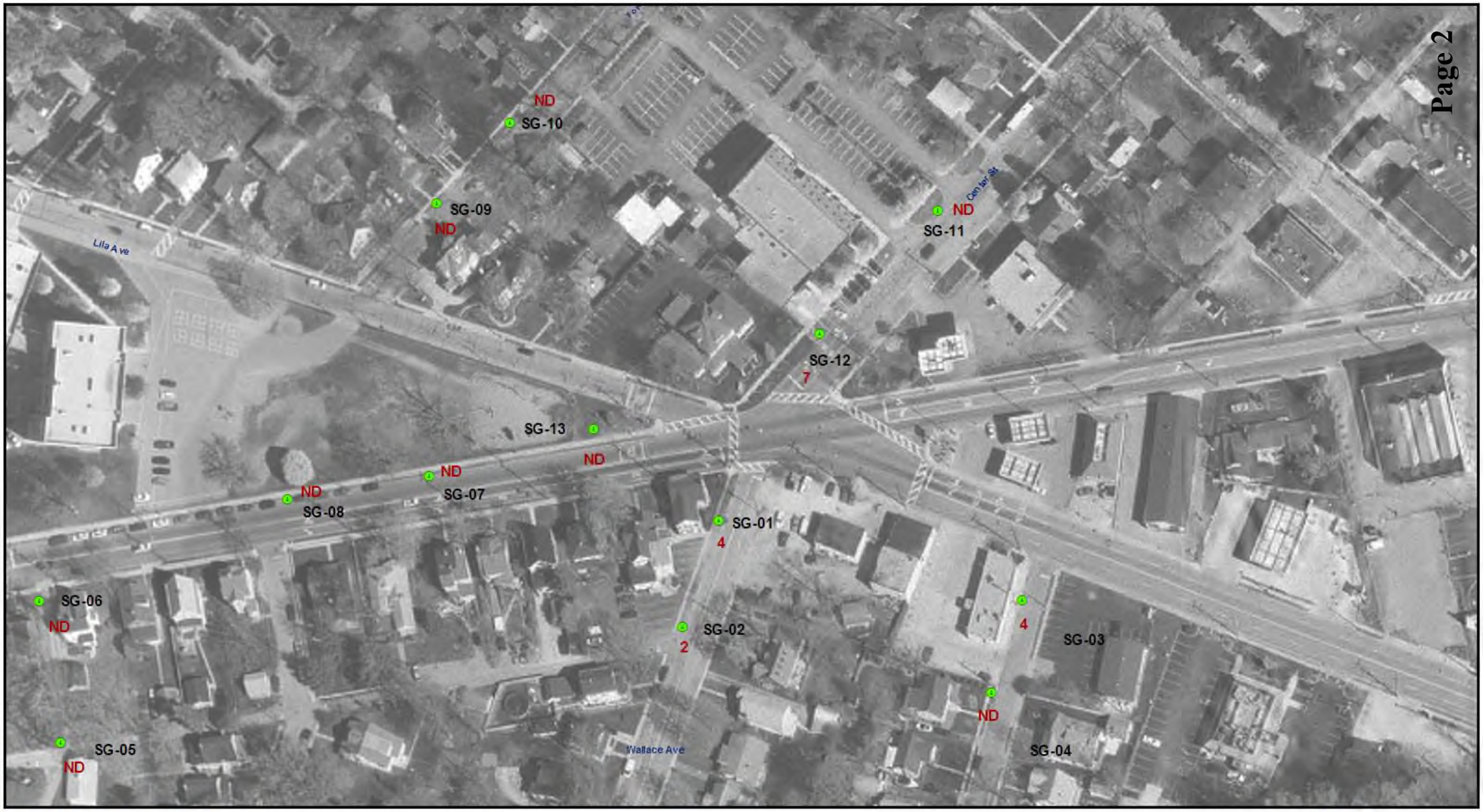
Prepared by J.R. Watterworth
December 21, 2006

Figure 1
Milford Well Field
September 2006 Sub-Slab Soil Gas and Ground Water Investigation Results

0 50 100 200
Feet

Legend

- Ohio EPA Monitoring Well Locations
- 1150 PCE Concentrations in Ground Water (ug/l)
- SG1 Sub-Slab Soil Gas Sample Locations
- 350 PCE Sub-Slab Soil Gas Cocentrations (ppbv)



OhioEPA

February 25, 2008
JRW

Figure 2
Milford Well Field
March 2007 Soil Gas PCE Concentrations

0 50 100 200
Feet

Legend

- Phase I Soil Gas Locations
- 7 PCE Concentrationin ppbv
- ND Non-detect

N

TW-11		
Analyte	*PCE*	*TCE*
Residential Risk	1.1E-05	4.7E-06
Residential Hazard	2.7E+00	1.1E+00
Commercial Risk	2.4E-06	<1E-06
Commercial Hazard	<1	<1

MW-14		
Analyte	*PCE*	*TCE*
Residential Risk	3.0E-05	1.8E-05
Residential Hazard	7.7E+00	4.2E+00
Commercial Risk	6.8E-06	2.9E-06
Commercial Hazard	1.8E+00	<1

MW-20		
Analyte	*PCE*	*TCE*
Residential Risk	1.3E-05	6.2E-06
Residential Hazard	3.3E+00	1.4E+00
Commercial Risk	2.9E-06	<1E-06
Commercial Hazard	<1	<1

MW-18		
Analyte	*PCE*	*TCE*
Residential Risk	2.3E-06	<1E-06
Residential Hazard	<1	<1
Commercial Risk	<1E-06	<1E-06
Commercial Hazard	<1	<1

TW-09		
Analyte	*PCE*	*TCE*
Residential Risk	1.8E-05	5.1E-06
Residential Hazard	4.5E+00	1.2E+00
Commercial Risk	4.0E-06	<1E-06
Commercial Hazard	1.1E+00	<1

MW-17		
Analyte	*PCE*	*TCE*
Residential Risk	2.8E-05	7.1E-06
Residential Hazard	7.2E+00	1.6E+00
Commercial Risk	6.4E-06	1.1E-06
Commercial Hazard	1.7E+00	<1

TW-03		
Analyte	*PCE*	*TCE*
Residential Risk	1.2E-06	2.7E-06
Residential Hazard	<1	<1
Commercial Risk	<1E-06	<1E-06
Commercial Hazard	<1	<1

NON RESPONSIVE

Legend

- New Monitoring Well Location
- Proposed Locations for MW-26
- Phase II - Soil Boring Location
- Phase II - Monitoring Well Location
- Phase II - Vertical Aquifer (VAS) Sampling Location
- Phase II - Temporary Well Location
- Transect (Phase II)
- Transect (Phase I)
- Phase I - Temporary Well Location
- Phase I - Soil Boring Location
- Existing Monitoring Well Location
- Existing Public Well Location
- Not Sampled

Red result indicates risk > 1E-06 or hazard > 1

Sampling locations where groundwater concentrations may potentially result in indoor air cancer risks greater than 1E-06 and non-cancer hazards greater than 1.0 are shown.

N

0 250 500

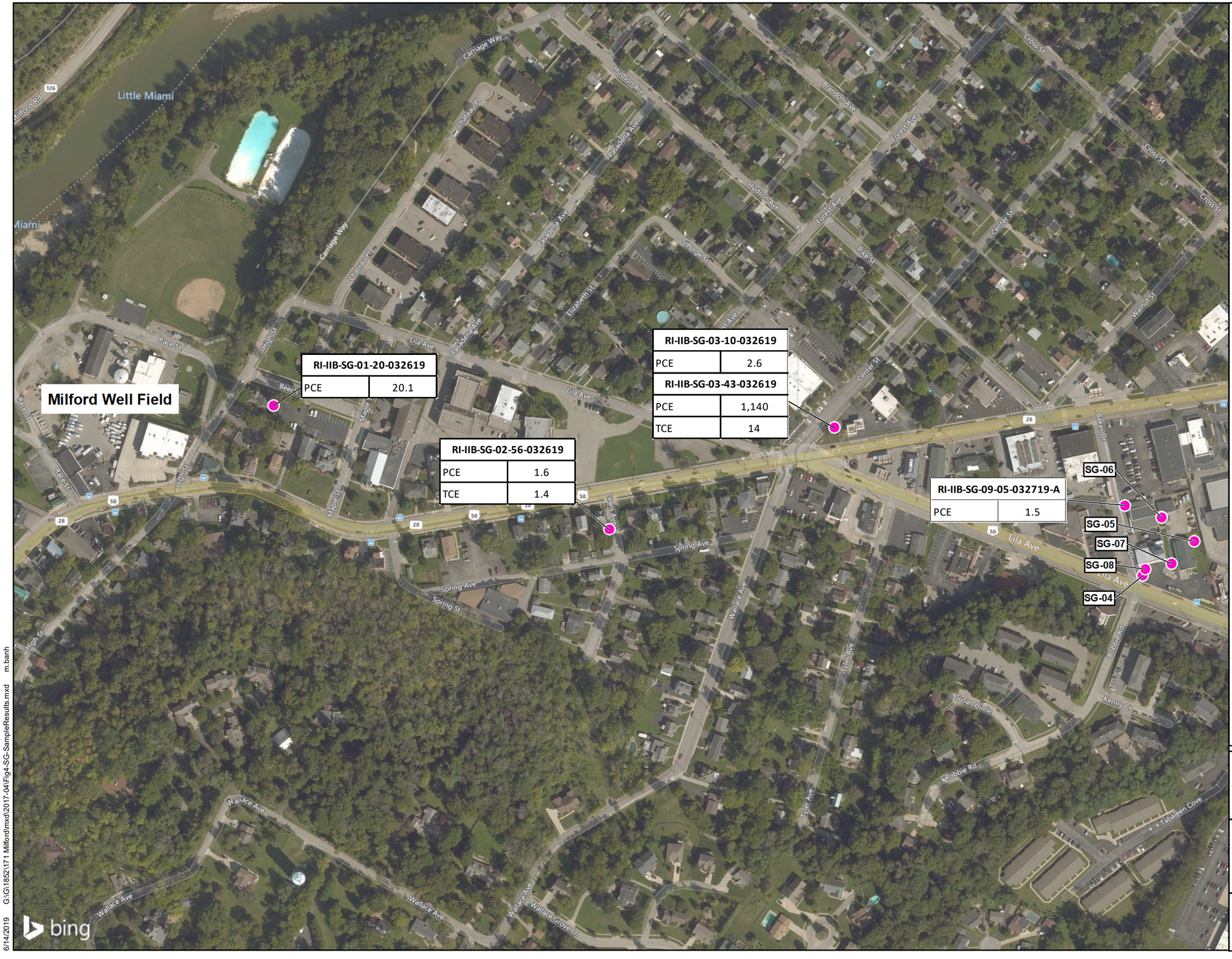
Feet

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

FIGURE 3
GROUNDWATER TO INDOOR AIR VAPOR INTRUSION SCREENING RESULTS

SulTRAC

4/12/2018 G:\G\1852\201 Milford\mxd\2018-03\Fig3-GW_IASampleResults.mxd m.banh



Legend

- Soil Gas Sample Location

$\mu g/m^3$ = micrograms per cubic meter
PCE = tetrachloroethene
TCE = trichloroethene
VISL = Vapor Intrusion Screening Level
Residential VISL for PCE = 1,390 $\mu g/m^3$
Residential VISL for TCE = 69.5 $\mu g/m^3$
Only detections are shown on the map
All results are presented in $\mu g/m^3$

N

0 250 500
Feet

MILFORD CONTAMINATED AQUIFER SITE
MILFORD, CLERMONT COUNTY, OHIO

FIGURE 4
March 2019 Soil Gas Sample Locations and Results

SulTRAC

6/14/2019 G:\G\18521\71 Milford\mxd\2017-04\Fig4-SG-SampleResults.mxd m.banh

Tables

(Seven Pages)

1 – Groundwater to Indoor Air VISL Evaluation

2 – Soil Gas Analytical Results Summary

TABLE 1
MILFORD CONTAMINATED AQUIFER SITE
GROUNDWATER TO INDOOR AIR VISL EVALUATION

Monitoring or Temporary Well	DTW (feet bgs)	PCE Result	TCE Result	GW Temperature	VISL Residential Cancer Risk/Hazard Quotient		VISL Commercial Cancer Risk/Hazard Quotient	
					PCE	TCE	PCE	TCE
Phase II TW								
TW-01	48.03	0.5U	0.5U	10.1	NA	NA	NA	NA
TW-02	46.9	0.63	0.5U	10.6	1.96E-08/5.07E-03	NA	4.48E-09/1.21E-03	NA
TW-03	46.4	36	5.9	13.2	1.30E-06/3.35E-01	2.90E-06/6.64E-01	2.97E-07/7.98E-02	4.63E-07/1.58E-01
Phase I TW								
TW-06	61.49	5.0U	5.0U	7.4	NA	NA	NA	NA
TW-07	57.88	5.0U	5.0U	12.0	NA	NA	NA	NA
TW-09	38.12	720D	15	7.5	1.87E-05/4.84E+00	5.54E-06/1.27E+00	4.28E-06/1.15E+00	8.87E-07/3.03E-01
TW-11	48.5	410D	13	8.4	1.12E-05/2.91E+00	5.03E-06/1.15E+00	2.57E-06/6.92E-01	8.04E-07/2.75E-01
TW-12	30.65	5.0U	5.0U	8.2	NA	NA	NA	NA
TW-13	30.7	5.0U	5.0U	9.5	NA	NA	NA	NA
TW-15	47.06	5.0J	5.0U	16.0	2.10E-07/5.43E-02	NA	NA	NA
Monitoring Wells								
MW-2	16.56	5.0U	5.0U	14.8	NA	NA	NA	NA
MW-3	19.43	5.0U	5.0U	15.3	NA	NA	NA	NA
MW-5S	25.5	5.0U	5.0U	14.9	NA	NA	NA	NA
MW-5D	27.64	2.8J	0.83J	13.7	1.04E-07/2.68E-02	4.17E-07/9.57E-02	NA	NA
MW-10S	20.35	1.3J	5.0U	16.0	5.45E-08/1.41E-02	NA	NA	NA
MW-10D	20.24	6.7	0.97J	15.0	2.66E-07/6.89E-02	5.19E-07/1.19E-01	NA	NA
MW-12	63.65	19	2.6J	14.4	7.31E-07/1.89E-01	1.35E-06/3.10E-01	1.67E-07/4.50E-02	2.16E-07/7.38E-02
MW-13	65.09	5.0J	0.43J	14.4	1.92E-07/4.98E-02	2.24E-07/ 5.13E-02	NA	NA
MW-14	55.13	760D	35	15.3	3.07E-05/7.95E+00	1.90E-05/4.36E+00	7.03E-06/1.89E+00	3.04E-06 /1.04E+00
MW-17	44.02	680D	13	16.1	2.87E-05/7.43E+00	7.33E-06/1.68E+00	6.57E-06/1.77E+00	1.17E-06/4.00E-01
MW-18	45.32	57	0.6J	15.6	2.34E-06/6.06E-01	3.30E-07/7.58E-02	5.36E-07/1.44E-01	5.28E-08/1.80E-02
MW-19	45.3	18	0.45J	14.9	7.11E-07/1.84E-01	2.40E-07 /5.50E-02	NA	NA
MW-20	45.31	390D	14	12.2	1.33E-05/3.44E+00	6.55E-06 /1.50E+00	3.04E-06/8.18E-01	1.05E-06/ 3.57E-01
Phase II VAS Summary*								
202	65	1.0U	1.0U	18.0	NA	NA	NA	NA
203	66	1.0U	1.0U	14.6	NA	NA	NA	NA
203/204	64.2	12	1.0U	14.3	4.59E-07/1.19E-01	NA	NA	NA
204	65	11	0.93J	14.0	4.14E-07 /1.07E-01	4.74E-07/1.09E-01	NA	NA
205	33.59	1.0U	1.0U	14.4	NA	NA	NA	NA
213	65	1.0U	1.0U	16.6	NA	NA	NA	NA
206	62	1.8	1.0U	17.1	8.01E-08/2.07E-02	NA	NA	NA
207	62.8	2.8	1.0U	16.0	1.17E-07/3.04E-02	NA	NA	NA
208	46	1.0U	1.0U	15.9	NA	NA	NA	NA
209	21.5	1.0U	1.0U	NA	NA	NA	NA	NA
214	62	1.0U	1.0U	17.4	NA	NA	NA	NA
210	48.26	8.1	1.0U	15.2	3.25E-07/8.42E-02	NA	NA	NA
211	44	1.0U	1.0U	NA	NA	NA	NA	NA
215	50	1.0U	1.0U	NA	NA	NA	NA	NA
MW-15		14	1.0U	20.3	7.38E-07/1.91E-01	NA	NA	NA

Notes:
*PCE and TCE results from the shallowest interval were used
Values in red indicate a calculated vapor intrusion risk greater than 1E-06 or hazard quotient greater than 1
Well-specific groundwater temperature was used in VISL calculator
bgs = below ground surface
DTW = Depth to Water
NA = Not applicable
PCE = tetrachlorotethene
TCE = trichloroethene
U = analyte was not detected
VAS = Vertical Aquifer Sample
VISL = vapor intrusion screening level

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-01-10-032619		RI-IIB-SG-01-20-032619		RI-IIB-SG-02-10-032619		RI-IIB-SG-02-56-032619		RI-IIB-SG-03-10-032619		RI-IIB-SG-03-10-032619-A		RI-IIB-SG-03-43-032619	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
TO-15 (ug/m^3)															
1,1,1-Trichloroethane	174000	2	U	171		2	U	5		2.1	U	2.1	U	574	
1,1,2,2-Tetrachloroethane	16.1	1.3	U	2.1	U	1.3	U	1.3	U	1.3	U	1.3	U	1.3	U
1,1,2-Trichloroethane	6.95	1	U	1.7	U	1	U	1	U	1	U	1	U	1.1	U
1,1,2-Trichlorotrifluoroethane	174000	2.9	U	4.7	U	2.9	U	2.9	U	2.9	U	2.9	U	4.9	
1,1-Dichloroethane	585	1.5	U	2.5	U	1.5	U	1.5	U	1.5	U	1.5	U	1.6	U
1,1-Dichloroethene	6950	1.5	U	2.4	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
1,2,4-Trichlorobenzene	69.5	13.8	U	22.7	U	13.8	U	14.1	U	14.1	U	14.1	U	14.3	U
1,2,4-Trimethylbenzene	2090	16.2		11.2		8.2		6.4		9.2	J	1.9	J	12.6	
1,2-Dibromoethane (EDB)	1.56	1.4	U	2.4	U	1.4	U	1.5	U	1.5	U	1.5	U	1.5	U
1,2-Dichlorobenzene	6950	2.2	U	3.7	U	2.2	U	2.3	U	2.3	U	2.3	U	2.3	U
1,2-Dichloroethane	36	0.75	U	1.2	U	0.75	U	0.77	U	0.77	U	0.77	U	0.78	U
1,2-Dichloropropane	139	1.7	U	2.8	U	1.7	U	1.8	U	1.8	U	1.8	U	1.8	U
1,3,5-Trimethylbenzene	2090	4.8	U	3.2		2.7	U	2.9	U	4.7	U	1.9	U	4.5	U
1,3-Butadiene	31.2	0.82	U	1.4	U	0.82	U	0.84	U	0.84	U	0.84	U	0.86	U
1,3-Dichlorobenzene	NA	2.2	U	3.7	U	2.2	U	2.3	U	2.6		2.3	U	2.3	U
1,4-Dichlorobenzene	85.1	5.6	U	9.2	U	5.6	U	5.7	U	5.7	U	5.7	U	5.8	U
1,4-Dioxane (p-Dioxane)	187	6.7	U	11	U	6.7	U	6.8	U	6.8	U	6.8	U	7	U
2,2,4-Trimethylpentane	NA	4.3	U	7.1	U	4.3	U	4.4	U	4.4	U	0.49	U	4.9	U
2-Butanone (MEK)	174000	6.1		24.5	U	9.2		23.5		9.9	U	7	U	28.7	
2-Hexanone	1040	7.6	U	12.5	U	7.6	U	7.8	U	7.8	U	7.8	U	7.9	U
2-Propanol	6950	19.4		7.5	U	5		46.3		4.7	U	4.7	U	27.9	
4-Ethyltoluene	NA	4.6	U	7.5	U	4.6	U	4.7	U	4.7	U	4.7	U	4.8	U
4-Methyl-2-pentanone (MIBK)	104000	7.6	U	12.5	U	7.6	U	7.8	U	7.8	U	7.8	U	7.9	U
Acetone	1070000	44		104		40.5		126		41.7	J	29.9	J	155	
Allyl chloride	34.8	2.9	U	4.8	U	2.9	U	3	U	3	U	3	U	3	U
Benzene	120	6.9		24.9		9.7		31		19.3	J	6.9	J	37.8	
Benzyl chloride	19.1	4.8	U	7.9	U	4.8	U	4.9	U	4.9	U	4.9	U	5	U
Bromodichloromethane	25.3	2.5	U	4.1	U	2.5	U	2.5	U	2.5	U	2.5	U	2.6	U

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-01-10-032619		RI-IIB-SG-01-20-032619		RI-IIB-SG-02-10-032619		RI-IIB-SG-02-56-032619		RI-IIB-SG-03-10-032619		RI-IIB-SG-03-10-032619-A		RI-IIB-SG-03-43-032619	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Bromoform	851	9.6	U	15.8	U	9.6	U	9.8	U	9.8	U	9.8	U	10	U
Bromomethane	174	1.4	U	2.4	U	1.4	U	1.5	U	1.5	U	1.5	U	1.5	U
Carbon disulfide	24300	1.2	U	1.9		1.2	U	2.6		2		1.2	U	2.9	
Carbon tetrachloride	156	2.3	U	3.9	U	2.3	U	2.4	U	2.4	U	2.4	U	2.4	U
Chlorobenzene	1740	1.7	U	2.8	U	1.7	U	1.8	U	1.8	U	1.8	U	1.8	U
Chloroethane	348000	0.98	U	1.6	U	0.98	U	1	U	1	U	1	U	1	U
Chloroform	40.7	0.91	U	1.5	U	0.91	U	0.93	U	0.93	U	0.93	U	0.94	U
Chloromethane	3130	1.6	U	1.3	U	0.77	U	3.8	U	0.79	U	0.79	U	1.4	
cis-1,2-Dichloroethene	NA	1.5	U	2.4	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
cis-1,3-Dichloropropene	NA	1.7	U	2.8	U	1.7	U	1.7	U	1.7	U	1.7	U	1.8	U
Cyclohexane	209000	21.5	U	49.7	U	20.5	U	42.3	U	48.1	U	20.9	U	59.7	U
Dibromochloromethane	NA	3.2	UJ	5.2	U	3.2	UJ	3.2	UJ	3.2	UJ	3.2	UJ	3.3	UJ
Dichlorodifluoromethane	3480	2.3		3	U	2.1		3.6		2.4		2.3		18.8	
Dichlorotetrafluoroethane	NA	2.6	U	4.3	U	2.6	U	2.7	U	2.7	U	2.7	U	2.7	U
Ethanol	NA	57.4		23.1		25		54.9		26.4	J	9.6	J	490	
Ethylbenzene	374	16.5		16.3		9.7		10.3		14.6	J	4.1	J	26.9	
Hexachloro-1,3-butadiene	42.5	9.9	U	16.3	U	9.9	U	10.1	U	10.1	U	10.1	U	10.3	U
Isopropylbenzene (Cumene)	13900	4.6	U	7.5	U	4.6	U	4.7	U	4.7	U	4.7	U	4.8	U
m&p-Xylene	3480	34.5		28.9		16.9		15.9		21.3	J	6	J	37.5	
Methylene Chloride	20900	56.1	U	14.7		12.7	U	34.9	U	33.9	U	31.3	U	51.3	U
Methyl-tert-butyl ether	3600	6.7	U	11	U	6.7	U	6.8	U	6.8	U	6.8	U	7	U
n-Heptane	13900	45.8		67.9		27.1		69.5		61.7	J	19.3	J	45.9	
n-Hexane	24300	42.6	U	112	U	43.4		119	U	108	J	40.2	UJ	84.4	U
n-Propylbenzene	3480	4.6	U	7.5	U	4.6	U	4.7	U	4.7	U	4.7	U	4.8	U
o-Xylene	34800	13		10.5		6.8		5.7		8.4	J	2.4	J	15.5	U
Styrene	34800	1.6	UJ	2.6	U	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ	1.6	UJ
Tetrachloroethene	1390	1.3	U	20.1		1.3	U	1.6		2.6		1.3	U	1140	
Tetrahydrofuran	69500	1.1	U	1.8	U	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U
Toluene	174000	37.7		56.4		27		84.1		46.4	J	16.6	J	78.4	

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-01-10-032619		RI-IIB-SG-01-20-032619		RI-IIB-SG-02-10-032619		RI-IIB-SG-02-56-032619		RI-IIB-SG-03-10-032619		RI-IIB-SG-03-10-032619-A		RI-IIB-SG-03-43-032619	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
trans-1,2-Dichloroethene	NA	1.5	U	2.4	U	1.5	U	1.5	U	1.5	U	1.5	U	1.5	U
trans-1,3-Dichloropropene	NA	1.7	U	2.8	U	1.7	U	1.7	U	1.7	U	1.7	U	1.8	U
Trichloroethene	69.5	1	U	1.6	U	1	U	1.4		1	U	1	U	13.8	
Trichlorofluoromethane	NA	2.1	U	3.4	U	2.1	U	2.1	U	2.1	U	2.1	U	6.9	
Vinyl chloride	55.9	0.48	U	0.78	U	0.48	U	0.49	U	0.49	U	0.49	U	0.49	U
Other (ug/m^3 unless otherwise noted)															
Helium	NA	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U	3.6	U

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-04-05-032719		RI-IIB-SG-05-05-032719		RI-IIB-SG-06-05-032719		RI-IIB-SG-07-05-032719		RI-IIB-SG-08-05-032719		RI-IIB-SG-09-05-032719		RI-IIB-SG-09-05-032719-A	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
TO-15 (ug/m^3)															
1,1,1-Trichloroethane	174000	2	U	2.2	R	2.2	R	2.1	R	2	U	2.2	U	2.2	U
1,1,2,2-Tetrachloroethane	16.1	1.3	U	1.4	R	1.4	R	1.3	R	1.3	U	1.4	U	1.4	U
1,1,2-Trichloroethane	6.95	1	U	1.1	R	1.1	R	1.1	R	1	U	1.1	U	1.1	U
1,1,2-Trichlorotrifluoroethane	174000	2.9	U	3	R	3	R	3	R	2.9	U	3	U	3.1	U
1,1-Dichloroethane	585	1.5	U	1.6	R	1.6	R	1.6	R	1.5	U	1.6	U	1.6	U
1,1-Dichloroethene	6950	1.5	U	1.6	R	1.6	R	1.5	R	1.5	U	1.6	U	1.6	U
1,2,4-Trichlorobenzene	69.5	13.8	U	14.6	R	14.6	R	14.3	R	13.8	U	14.6	U	14.9	U
1,2,4-Trimethylbenzene	2090	9.9		38.9	R	22	R	22.5	R	24.5		4.4	J	2.7	J
1,2-Dibromoethane (EDB)	1.56	1.4	U	1.5	R	1.5	R	1.5	R	1.4	U	1.5	U	1.5	U
1,2-Dichlorobenzene	6950	2.2	U	2.4	R	2.4	R	2.3	R	2.2	U	2.4	U	2.4	U
1,2-Dichloroethane	36	0.75	U	0.8	R	0.8	R	0.78	R	0.75	U	0.8	U	0.81	U
1,2-Dichloropropane	139	1.7	U	1.8	R	1.8	R	1.8	R	1.7	U	1.8	U	1.9	U
1,3,5-Trimethylbenzene	2090	2.5	U	11.4	R	7.6	R	6.4	R	8	U	1.9	U	2	U
1,3-Butadiene	31.2	0.82	U	0.87	R	0.87	R	0.86	R	0.82	U	0.87	U	0.89	U
1,3-Dichlorobenzene	NA	2.2	U	2.4	R	2.4	R	2.9	R	2.2	U	3.1		2.5	
1,4-Dichlorobenzene	85.1	5.6	U	5.9	R	5.9	R	5.8	R	5.6	U	5.9	U	6.1	U
1,4-Dioxane (p-Dioxane)	187	6.7	U	7.1	R	7.1	R	7	R	6.7	U	7.1	U	7.2	U
2,2,4-Trimethylpentane	NA	4.3	U	4.6	R	4.6	R	4.5	R	4.3	U	4.6	U	4.7	U
2-Butanone (MEK)	174000	83.1		11.4	R	30.3	R	13.6	R	10.2		5.8	U	5.9	U
2-Hexanone	1040	7.6	U	8.1	R	8.1	R	7.9	R	7.6	U	8.1	U	8.2	U
2-Propanol	6950	10.3		4.8	R	16.1	R	4.8	R	4.6	U	4.8	U	8.1	
4-Ethyltoluene	NA	4.6	U	11.8	R	8.1	R	6.3	R	5.5	U	4.8	U	5	U
4-Methyl-2-pentanone (MIBK)	104000	7.6	U	8.1	R	8.1	R	7.9	R	7.6	U	8.1	U	8.2	U
Acetone	1070000	98		183	R	162	R	117	R	38.6		21.6		24.3	
Allyl chloride	34.8	2.9	U	3.1	R	3.1	R	3	R	2.9	U	3.1	U	3.1	U
Benzene	120	1.9		2.3	R	2.2	R	1.9	R	22.1		3.1		2.9	
Benzyl chloride	19.1	4.8	U	5.1	R	5.1	R	5	R	4.8	U	5.1	U	5.2	U
Bromodichloromethane	25.3	2.5	U	2.6	R	2.6	R	2.6	R	2.5	U	2.6	U	2.7	U

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-04-05-032719		RI-IIB-SG-05-05-032719		RI-IIB-SG-06-05-032719		RI-IIB-SG-07-05-032719		RI-IIB-SG-08-05-032719		RI-IIB-SG-09-05-032719		RI-IIB-SG-09-05-032719-A	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
Bromoform	851	9.6	U	10.2	R	10.2	R	10	R	9.6	U	10.2	U	10.4	U
Bromomethane	174	1.4	U	1.5	R	1.5	R	1.5	R	1.4	U	1.5	U	1.6	U
Carbon disulfide	24300	60.7		1.2	R	9.7	R	2.4	R	3.5		1.2	U	1.3	U
Carbon tetrachloride	156	2.3	U	2.5	R	2.5	R	2.4	R	2.3	U	2.5	U	2.5	U
Chlorobenzene	1740	1.7	U	1.8	R	1.8	R	1.8	R	1.7	U	1.8	U	1.9	U
Chloroethane	348000	0.98	U	1	R	1	R	1	R	0.98	U	1	U	1.1	U
Chloroform	40.7	0.91	U	0.96	R	0.96	R	0.94	R	0.91	U	0.96	U	0.98	U
Chloromethane	3130	1.5		0.96	R	4.6	R	2.3	R	0.77	U	1.3	U	1.6	U
cis-1,2-Dichloroethene	NA	1.6		1.6	R	1.6	R	1.5	R	1.5	U	1.6	U	1.6	U
cis-1,3-Dichloropropene	NA	1.7	U	1.8	R	1.8	R	1.8	R	1.7	U	1.8	U	1.8	U
Cyclohexane	209000	4.6	U	3.4	R	3.4	R	3.3	R	41.4	U	9	U	4.4	U
Dibromochloromethane	NA	3.2	UJ	3.4	R	3.4	R	3.3	R	3.2	UJ	3.4	UJ	3.4	UJ
Dichlorodifluoromethane	3480	2.1		2	R	2	R	1.9	R	1.8	U	2	U	2	U
Dichlorotetrafluoroethane	NA	2.6	U	2.8	R	2.8	R	2.7	R	2.6	U	2.8	U	2.8	U
Ethanol	NA	80.2		23.9	R	31.1	R	22.1	R	5		13.1	J	9.2	J
Ethylbenzene	374	3.7		3.1	R	3.2	R	2.2	R	35.9		1.7	U	1.7	U
Hexachloro-1,3-butadiene	42.5	9.9	U	10.5	R	10.5	R	10.3	R	9.9	U	10.5	U	10.7	U
Isopropylbenzene (Cumene)	13900	4.6	U	4.8	R	4.8	R	4.8	R	4.6	U	4.8	U	5	U
m&p-Xylene	3480	13.5		13.3	R	13.1	R	8.2	R	45.7		3.4	U	3.5	U
Methylene Chloride	20900	17.3	U	28.5	R	27.9	R	15.9	R	12.4	U	16.4		17.1	
Methyl-tert-butyl ether	3600	6.7	U	7.1	R	7.1	R	7	R	6.7	U	7.1	U	7.2	U
n-Heptane	13900	1.5	U	1.6	R	2.3	R	2.3	R	37.3		5.7		5.2	U
n-Hexane	24300	4.2	U	4.1	R	7	R	4.7	R	62.7	U	11.8	U	11.5	U
n-Propylbenzene	3480	4.6	U	7.9	R	5	R	4.8	R	8.6		4.8	U	5	U
o-Xylene	34800	5.2		9.6	R	7.4	R	5.3	R	19.6		1.7	U	1.7	U
Styrene	34800	1.6	UJ	1.7	R	1.7	R	1.6	R	1.6	UJ	1.7	UJ	1.7	UJ
Tetrachloroethene	1390	1.3	U	1.3	R	1.3	R	1.3	R	1.3	U	1.3	U	1.5	
Tetrahydrofuran	69500	1.1	U	1.2	R	1.2	R	1.1	R	1.1	U	1.2	U	1.2	U
Toluene	174000	9.2		4.9	R	6.5	R	4.3	R	79		5.7		4.8	

TABLE 2
MILFORD CONTAMINATED AQUIFER SITE
SOIL GAS ANALYTICAL RESULTS SUMMARY

Analyte	EPA VISL (Residential Soil Gas) (ug/m^3)	RI-IIB-SG-04-05-032719		RI-IIB-SG-05-05-032719		RI-IIB-SG-06-05-032719		RI-IIB-SG-07-05-032719		RI-IIB-SG-08-05-032719		RI-IIB-SG-09-05-032719		RI-IIB-SG-09-05-032719-A	
		Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier	Result	Qualifier
trans-1,2-Dichloroethene	NA	1.5	U	1.6	R	1.6	R	1.5	R	1.5	U	1.6	U	1.6	U
trans-1,3-Dichloropropene	NA	1.7	U	1.8	R	1.8	R	1.8	R	1.7	U	1.8	U	1.8	U
Trichloroethene	69.5	1	U	1.1	R	1.1	R	1	R	1	U	1.1	U	1.1	U
Trichlorofluoromethane	NA	2.1	U	2.2	R	2.2	R	2.2	R	2.1	U	2.2	U	2.3	U
Vinyl chloride	55.9	0.48	U	0.5	R	0.5	R	0.49	R	3.1	U	0.5	U	0.51	U
Other (ug/m^3 unless otherwise noted)															
Helium	NA	3.6	U	54%		43.20%		18.40%		3.6	U	3.6	U	3.6	U

Notes:

J = The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample.

J+=The analyte was positively identified; the associated value is the approximate concentration of the analyte in the sample and may be biased high.

J-= The analyte was positively identified; the associated value is the approximate concentration of the anaylte in the sample and may be biased low.

R=The sample result is rejected as unusable due to serious deficiences in one or more quality control criteria. The analyte may or may not be present.

U=The analyte was positively identified, but was not detected above the associated value (reporting limit).

UJ= The analyte was analzed for, but was not detected above the reporting limit, considered approximate due to deficiencies in one of more quality control criteria.

ug/m³=micrograms per cubic meter

Results are compared to May 2019 EPA VISL for residential soil gas (cancer risk of 1E-05 and HQ of 1 for consistency with Ohio Environmental Protection Agency vapor intrusion guidance)